The number of voluntary markets has been increasing. In the United States, some of the companies involved in carbon credit trading are the Chicago Climate Exchange, AgraGate, and the Environmental Credit Corporation. Trading prices have been variable. For the Chicago Climate Exchange, the price per metric ton of CO_2 in 2008 went from $2 in early 2008 to $7 in mid-summer, and back to $2 in the fall. The price rose dramatically during mid-2008 in anticipation of legislation, but dropped just as dramatically when legislation stalled.

In 2008 in North Carolina, NC Green Power (http://www.ncgreenpower.org/) initiated a program for selling carbon offsets (http://www.ncgreenpower.org/signup/carbon_offset_rfp.html). The initial price was $4 per 500 pounds of carbon dioxide equivalent offset. Under the program, certain participating utilities offer their customers the option to subscribe to available tariffs to support carbon offsets. These tariffs allow customers to subsidize the mitigation of greenhouse gases (carbon dioxide equivalents). These carbon offsets will be offered on a monthly basis for a premium. Each block of carbon offset subsidized by a consumer or business will allow the NC GreenPower carbon offset program administrator to buy an equivalent block of carbon dioxide equivalents mitigated by an emission reduction project and sourced directly from the project or from the voluntary carbon offset market. Some of the requirements for the emission reduction projects are that there be no renewable energy credits, the reduction must be permanent, and the project must have "additionality" (cannot be mandated by law and would not have occurred for any reason besides concern for mitigation of climate change, or in other words, must be beyond business as usual).

There are efforts by local governments in the U.S. to reduce GHG emissions, and these legally binding agreements and registries can create additional markets to sell methane destruction credits. There is a state level cap and trade program for nine northeastern states in the Regional Greenhouse Gas Initiative (RGGI), started in January 2007. In 2006, California signed into law the Global Warming Solutions Act requiring reduction of GHG emissions by 25 percent by 2020.

Interest in reducing GHG emissions is increasing worldwide, and this has led to attempts to create new markets for carbon credits. The potential for having cap and trade programs in various states or potentially for the entire United States under an agreement such as the Kyoto Protocol leads to speculation that the price of carbon credits could increase substantially.

The Potential for Methane Collection and Combustion

Over 2,000 anaerobic lagoons are active in North Carolina, mostly on pig farms, but some on poultry and dairy farms. Anaerobic lagoons emit biogas that consists mainly of methane (about $^2/_3$) and carbon dioxide (roughly $^1/_3$), and small amounts of other gases such as ammonia, hydrogen sulfide, and water vapor. If a lagoon is covered and the gases are collected and combusted, then the methane is converted to carbon dioxide, and water vapor during combustion and methane emissions is reduced compared to an uncovered lagoon. Although carbon dioxide emissions result from combusting the biogas, the overall equivalent carbon emission is reduced, because methane has about 21 times the heat-trapping or global-warming potential as carbon dioxide. Methane collection and combustion can help reduce the carbon footprint of animal operations and offers potential revenues from carbon credits or energy.

Markets established to buy and sell carbon credits, such as the Chicago Climate Exchange, use specific methods to calculate the carbon offset or carbon credits obtained by collecting and combusting the methane. An example of specifications and guidelines for methane emission offset projects and their verification is available at the Web site of the Chicago Climate Exchange (CCX). Its specifications for agricultural methane emission offset projects can be found at http://www.chicagoclimatex.com/content.jsf?id=103. For CCX, methane collection or combustion projects activated on or after January 1, 1999, may qualify.

Guidelines for the CCX agricultural methane gas project can be found at http://www.chicagoclimatex.com/docs/offsets/Agriculture_Methane_Protocol.pdf.

These guidelines include the overall approach for crediting methane reductions from anaerobic digestion of animal manure as emission offsets, the protocol for calculating methane generation, and the protocol for measuring, recording, and verifying anaerobic digester methane recovery rates based on biogas flow and methane measurements. The guidelines include tables of methane emission factors by state for animal type and by baseline manure management system. The emissions baseline is the amount of methane that would be emitted to the atmosphere during the crediting period in the absence of the anaerobic digester project.